

# ***MATHEMATICS***

## ***Seventh Grade***

### **NUMBER AND OPERATIONS**

*The student will identify, represent, order, and compare numbers; and estimate, compute, and solve problems.*

<b>Key</b>	<b>Reporting Category</b>		
<b>M</b>		Identify the place value of a given digit.	
<b>I</b>		Develop meaning for perfect squares (e.g., 1, 4, 9, and 16).	
<b>I</b>		Develop meaning for square roots.	
<b>I</b>		Use exponential notation for powers of whole numbers.	
<b>I</b>		Use a variety of models to demonstrate the relationships within the real number system (e.g., Venn diagrams, webs).	
<b>A</b>	<b>N</b>	Represent numbers using a variety of equivalent forms (i.e., mixed numbers, fractions, decimals, percents, and integers).	
<b>A</b>	<b>N</b>	Compare rational numbers using the appropriate symbol (<, >, and =).	
<b>A</b>	<b>N</b>	Connect rational numbers to locations on a number line.	
<b>A</b>	<b>N</b>	Connect percents greater than 100 and percents less than one to real-world situations.	
<b>A</b>	<b>N</b>	Use ratios to represent quantitative relationships.	
<b>D</b>		Understand and use ratios and proportions to represent quantitative relationships.	
<b>A</b>	<b>N</b>	Identify the opposite and the reciprocal of a rational number.	
<b>D</b>		Use concrete, pictorial, and symbolic representations for integers, including locations on a number line.	
<b>D</b>		Apply number theory concepts to solve problems (e.g., divisibility, factors, multiples, composite numbers, prime numbers, prime factorization, and relatively prime).	
<b>A</b>	<b>N</b>	Identify prime and composite numbers up to 50.	
<b>A</b>	<b>N</b>	Compute efficiently and accurately with whole numbers, fractions, and decimals.	I'm Thirsty, p.W134 Lobster in Your Lunch Box, p.W245 Checks and Balances, p.W387
<b>D</b>		Understand the meaning and effects of arithmetic operations with fractions and decimals.	
<b>D</b>		Use models to demonstrate meaning and effects of arithmetic operations with integers.	
<b>M</b>		Apply the associative and commutative properties of addition and multiplication to simplify computations with integers, fractions, and decimals.	
<b>A</b>	<b>N</b>	Apply order of operations when computing with whole numbers (no more than two parentheses and no exponents).	
<b>D</b>		Apply order of operations when computing with decimals and fractions.	
<b>M</b>		Understand and use the inverse relationships of addition and subtraction and multiplication and division to simplify computations and solve problems.	
<b>D</b>		Select and use appropriate methods and tools for computing with whole numbers, fractions, decimals, percents, and integers in problem solving	

#### **KEY**

**I = Introduced D = Developing A = State Assessed M = Mastered**

#### **REPORTING CATEGORY**

**N = Number & Operations AT = Algebraic Thinking C = Computation R = Real World Problem Solving**  
**DP = Data Analysis & Probability ME = Measurement G = Geometry GR = Graphs & Graphing**

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		situations (e.g., mental computation, estimation, calculators, number line, computers, and paper and pencil).	
<b>D</b>		Analyze procedures for computing with fractions, decimals, and integers.	
<b>D</b>		Estimate the results of rational number computations in real-world situations.	
<b>A</b>	<b>N</b>	Use estimation strategies to select a reasonable solution to a computation involving rational numbers.	
<b>D</b>		Determine if the results of rational number estimates and computations are reasonable.	
<b>A</b>	<b>N</b>	Select a reasonable solution to a real-world division problem in which the remainder must be considered.	
<b>A</b>	<b>R</b>	Solve one- and two-step real-world problems involving whole numbers, fractions, and decimals.	
<b>D</b>		Solve two-step real-world problems involving percents.	
<b>D</b>		Develop methods for solving problems involving proportions (e.g., scaling, and finding equivalent ratios).	

## ALGEBRA

*The student will analyze and use symbols to generalize patterns, use properties of operations, and analyze change in various situations.*

<b>D</b>		Represent, analyze, and extend geometric and numerical patterns.	
<b>A</b>	<b>AT</b>	Extend geometric and numerical patterns.	
<b>I</b>		Develop understanding for arithmetic sequences.	
<b>A</b>	<b>AT</b>	Generalize patterns in data represented in tables and graphs.	
<b>A</b>	<b>R</b>	Extend rate charts to solve real-world problems.	
<b>A</b>	<b>AT</b>	Apply function rules.	
<b>D</b>		Create function rules.	
<b>D</b>		Demonstrate understanding of different uses of variables.	
<b>A</b>	<b>AT</b>	Represent mathematical statements and real-world situations using symbols.	
<b>I</b>		Translate one-variable verbal and written expressions into algebraic expressions.	
<b>A</b>	<b>AT</b>	Evaluate algebraic expressions given the value of two or more variables.	
<b>A</b>	<b>AT</b>	Solve one-step linear equations.	
<b>A</b>	<b>AT</b>	Identify whole numbers that satisfy a given one-variable inequality.	
<b>D</b>		Model algebraic equations with manipulatives, technology, and paper and pencil.	
<b>A</b>	<b>R</b>	Solve real-world problems involving one-step linear equations.	
<b>I</b>		Explore relationships between symbolic expressions and graphs of lines.	
<b>A</b>	<b>GR</b>	Select a scatterplot to represent data presented in tabular form.	
<b>D</b>		Create a scatterplot to represent data presented in a tabular form.	
<b>D</b>		Describe the relationship between two quantities represented in a scatterplot.	
<b>D</b>		Describe how changes in one quantity or variable result in changes in another.	
<b>A</b>	<b>GR</b>	Interpret graphs which represent rates of change.	

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<b>D</b>		Use unit rates to solve problems (e.g., miles per hour, and words per minutes).	
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## GEOMETRY

*The student will analyze and describe characteristics and properties of 2- and 3-dimensional shapes, locate and specify points on a grid, and use geometric concepts (e.g., symmetry and transformations) and reasoning to solve problems.*

<b>A</b>	<b>G</b>	Determine congruence of line segments, angles, and polygons.	
<b>A</b>	<b>G</b>	Classify triangles by angle, size, and length of sides.	
<b>D</b>		Compare and classify triangles by angle, size, and length of sides.	
<b>A</b>	<b>G</b>	Determine the measure of an angle of a triangle, given the measures of the other two angles.	
<b>A</b>	<b>G</b>	Classify polygons by properties.	
<b>D</b>		Compare and classify polygons by properties.	
<b>D</b>		Use appropriate mathematical language to describe similarity and congruence.	
<b>D</b>		Locate and specify points on the coordinate plane.	
<b>A</b>	<b>GR</b>	Use ordered pairs to describe given points in a coordinate system.	
<b>D</b>		Relate symmetry and congruence to reflections (flips) about a line or to other transformations.	
<b>A</b>	<b>G</b>	Identify the results of transformations of two-dimensional figures (i.e., turns/rotations, flips/reflections, slides/translations).	
<b>M</b>		Use appropriate tools and methods to draw geometric objects with specified properties, (e.g., side lengths, and angle measure).	
<b>M</b>		Identify and build a three-dimensional object from a two-dimensional representation (net) of that object and vice versa.	
<b>A</b>	<b>R</b>	Apply spatial reasoning and visualization to solve real-world problems.	

## MEASUREMENT

*The student will determine time, length, perimeter, area, weight, capacity, and temperature and solve real-world problems involving measurement.*

<b>M</b>		Understand both metric and customary systems of measurement.	
<b>A</b>	<b>ME</b>	Convert from one unit to another within the same system.	Bird Olympics, p.FW187
<b>A</b>	<b>ME</b>	Select units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.	Where Does Water Run? , p.AW21 Puddle Wonders! , p.AW114 Watershed, p.AW132
<b>D</b>		Understand, select, and use units of appropriate size and type to measure angles, perimeter, areas, surface area, and volume.	Where Does Water Run? , p.AW21 Puddle Wonders! , p.AW114 Watershed, p.AW132
<b>A</b>	<b>ME</b>	Estimate length, perimeter, circumference, area, and volume using a variety of strategies.	
<b>A</b>	<b>ME</b>	Determine the distance between two points on the x- or the y-axis in Quadrant I.	
<b>D</b>		Select and apply techniques and tools to accurately measure length, perimeter, area, volume, and angles to appropriate levels of precision.	Where Does Water Run? , p.AW21 Puddle Wonders! , p.AW114 Watershed, p.AW132

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<b>A</b>	<b>ME</b>	Apply formulas to determine the areas of rectangles, triangles, parallelograms, trapezoids, and circles.	
<b>D</b>		Develop and use formulas to determine the circumference of circles.	
<b>A</b>	<b>ME</b>	Find or estimate area of irregular and complex shapes.	
<b>I</b>		Develop strategies to determine the surface area and volume of selected prisms and cylinders.	
<b>D</b>		Construct tables and graphs to represent rates of change.	
<b>A</b>	<b>R</b>	Solve problems involving scale factors using ratios and proportions.	

## DATA ANALYSIS AND PROBABILITY

*The student will collect, organize, analyze, interpret, and display data in tables and graphs and determine the probabilities of outcomes in simple experiments.*

<b>M</b>		Formulate questions, design studies, and collect real-world data.	Water's Going On?, p.AW149 Alice in Waterland, p.AW151
<b>D</b>		Construct, interpret, and use multiple-bar graphs, multiple-line graphs, and circle graphs displaying real-world data.	Hidden Hazards, p.FW105
<b>A</b>	<b>DP</b>	Interpret circle graphs displaying real-world data.	
<b>A</b>	<b>DP</b>	Interpret bar and line graphs to answer questions and solve real-world problems.	Eat and Glow, p.AW69 Where....All the Salmon.? , p.AW166
<b>D</b>		Find, use, and interpret measures of center and spread (e.g., mean, interquartile range).	
<b>A</b>	<b>DP</b>	Determine the mean for a data set.	
<b>A</b>	<b>DP</b>	Determine the median for a data set.	
<b>A</b>	<b>GR</b>	Make predictions based on data.	
<b>D</b>		Make conjectures and predictions based on data.	
<b>D</b>		Recognize misleading representations of data.	
<b>A</b>	<b>DP</b>	Connect data sets and their graphical representations (i.e., bar graphs, stem-and-leaf plots, box plots, and scatterplots).	Net Gain, Net Effect, p.AW85 What's in the Water?, p.140
<b>D</b>		Discuss and understand the relationship between data sets and their graphical representations (e.g., bar graphs, line graphs, circle graphs, histograms, stem-and-leaf plots, box plots, and scatterplots).	Net Gain, Net Effect, p.AW85 What's in the Water?, p.140
<b>D</b>		Make conjectures and predictions based on data.	
<b>A</b>	<b>AT</b>	Use proportional thinking to make conjectures about results of experiments and simulations.	
<b>D</b>		Make conjectures to formulate new questions for future studies.	
<b>D</b>		Determine the probability for an outcome in an experiment.	
<b>A</b>	<b>DP</b>	Connect the symbolic representation of a probability to an experiment.	
<b>D</b>		Construct a tree diagram to determine all possible outcomes of a simple event.	
<b>A</b>	<b>DP</b>	Use a tree diagram or make an organized list to determine all possible outcomes of a simple compound event.	

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